

**IN THE CLAIMS**

Kindly cancel the original claims without prejudice or disclaimer.

1-19 (canceled)

Kindly enter the following new claims.

20. (new) An attenuated strain of *Salmonella* suitable for use in a viable live vaccine, wherein the attenuated *Salmonella* strain is transformed with nucleic acid encoding Human papillomavirus (HPV) L1 major capsid protein wherein the protein assembles in the microorganism to form virus like particles (VLPs) that are capable of eliciting an immune response sufficient to produce neutralizing antibodies in serum and/or genital secretions when the microorganism is administered to a human or animal body.

21. (new) The attenuated *Salmonella* strain of Claim 20 which is an attenuated strain of *Salmonella typhimurium*, *Salmonella typhi*, *Salmonella dublin*, or *Salmonella enteritidis*.

22. (new) The attenuated *Salmonella* strain of Claim 21, wherein the *Salmonella* strain is attenuated by mutation selected from the group consisting of mutation in the PhoP/PhoQ system and  $\Delta$ cya,  $\Delta$ crp and  $\Delta$ cdt mutation.

23. (new) The attenuated *Salmonella* strain of Claim 20, wherein the HPV L1 major capsid protein is expressed as a chimera with a fusion partner.

24. (new) The attenuated *Salmonella* strain of Claim 23, wherein the HPV L1 major capsid protein is coexpressed with L2 protein, the L2 protein being fused to the fusion partner.

25. (new) The attenuated *Salmonella* strain of Claim 23, wherein the fusion partner is E6, E7 or E2 HPV protein, an immunogenic protein from a non-HPV pathogen or a tumor specific antigen.

26. (new) The attenuated *Salmonella* strain of Claim 20, wherein the microorganism is transformed with nucleic acid encoding two or more papillomavirus major capsid proteins.

27. (new) A composition comprising one or more of the attenuated *Salmonella* strains of Claim 20 in combination with a physiologically acceptable carrier.

28. (new) A vaccine comprising one or more of the attenuated *Salmonella* strains of Claim 20 in combination with a physiologically acceptable carrier.

29. (new) The vaccine of Claim 28 formulated for mucosal immunization.

30. (new) The vaccine of Claim 29, wherein the mucosal immunization is via an oral, rectal, nasal, or genital route.

31. (new) The vaccine of Claim 28, wherein the vaccine provides protection against Human papillomavirus infection or Human papillomavirus associated cancer of the anogenital tract.

32. (new) A method for producing assembled Human papillomavirus virus-like particles comprising culturing an attenuated *Salmonella* strain of Claim 20 and recovering the assembled virus like particles thus produced.

33. (new) A method of detecting the presence of anti-papillomavirus antibodies in a sample from a subject, the method comprising immobilizing HPV VLPs on a solid support, exposing the support to the sample and detecting the antibodies binding to the

immobilized HPV VLPs, wherein the HPV VLPs are produced by an attenuated *Salmonella* strain of Claim 20.

34. (new) A method of treating a patient in need of prophylaxis or therapy of a Human papillomavirus infection or Human papillomavirus associated cancer of the anogenital tract comprising administering to that patient a prophylactically or therapeutically effective amount of an attenuated *Salmonella* strain as claimed in Claim 20.

35. (new) The method of Claim 34, wherein the attenuated strain is a  $\Delta\beta$ -aspartate semi-aldehyde dehydrogenase (asd) attenuated *Salmonella* including a plasmid carrying both asd and Human papillomavirus L1 major capsid protein encoding nucleic acid sequences such that in vivo selection pressure is provided to maintain the presence in the attenuated strain of the Human papillomavirus L1 major capsid protein encoding DNA.

36. (new) The attenuated *Salmonella* strain of Claim 20, wherein the HPV L1 major capsid protein is HPV16 L1 major capsid protein.

37. (new) The vaccine of Claim 28, wherein the HPV L1 major capsid protein is HPV16 L1 major capsid protein.

38. (new) The method of Claim 32, wherein the HPV L1 major capsid protein is HPV16 L1 major capsid protein.

39. (new) The method of Claim 34, wherein the HPV L1 major capsid protein is HPV16 L1 major capsid protein.